

WHAT IS CLAIMED IS:

1. A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said 5 developing device being usable with a main assembly of an electrophotographic image forming apparatus, said developing device comprising:
  - a developing member for supplying a developer to the electrophotographic photosensitive member for 10 developing the electrostatic latent image formed on said electrophotographic photosensitive member;
  - a first electrode provided opposed to developing member;
  - a second electrode disposed such that at least a lower end thereof takes a position lower than 15 said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;
- wherein an electric signal is generated in 20 accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is 25 measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

2. A device according to Claim 1, wherein said first electrode and said second electrode are disposed along a length of said developing member which is in the form of a developing roller.

5

3. A device according to Claim 1 or 2, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing device frame, said recess 10 opens downward.

4. A device according to Claim 1, 2 or 3, wherein each of said first electrode and second electrode has a plate shape, wherein a length of said 15 first electrode, measured in a direction crossing with a longitudinal direction of said developing member, is longer than said second electrode.

5. A device according to Claim 1 or 2, wherein one and the other of said first and second electrodes 20 are plate-like and rod-like electrodes.

6. A developing device for developing an electrostatic latent image formed on an 25 electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said

developing device comprising;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said  
5 electrophotographic photosensitive member;

a first electrode disposed opposed to said developing member;

10 a second electrode disposed such that at least a lower end thereof takes a position lower than said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;

a third electrode disposed between said second electrode and said developing member;

15 a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said  
20 electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to send developing member when said developing device is mounted to the main assembly of said  
25 electrophotographic image forming apparatus;

a third electrical contact for transmitting,

to the main assembly of said electrophotographic image forming apparatus, an electric signal corresponding at least to electrostatic capacities between said first electrode and second electrode and between said

- 5 developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member, to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

10

7. A device according to Claim 6, wherein said first electrode and said second electrode are disposed along a length of said developing member which is in the form of a developing roller.

15

8. A device according to Claim 6 or 7, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing member, and said recess opens downward.

20

9. A device according to Claim 6, 7 or 8, wherein said third electrode is a member which is integral with or separate from said second electrode, and is disposed opposed to said developing member.

25

10. A device according to any one of Claims 6-9,

DEPOSED COPY

further comprising a developer chamber having an opening in which said developing member is supported, and a developer container, connected with said developer chamber, for accommodating the developer, 5 wherein said first, second and third electrodes are provided in said developer chamber.

11. A device according to any one of Claims 1-10, further comprising developer stirring means for 10 stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

15 12. A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said 20 developing device comprising;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

25 a developer accommodating portion for accommodating the developer to be used for development of the electrostatic latent image by said developing

member;

a developer path electrode disposed along a path along which the developer accommodated in said developer accommodating portion moves to said

5 developing member;

wherein an electric signal corresponding to an electrostatic capacity between said developing member and said developer path electrode is generated when a voltage is applied to said developing member  
10 from the main assembly of said electrophotographic image forming apparatus, to permit detection of a remaining amount of the developer by measuring the electric signal.

15 13. A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said  
20 developing device comprising;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

25 a first electrode provided so as to exhibit the same or potential as said developing member;

a second electrode disposed such that at

least a lower end thereof takes a position lower than said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;

5           a developer path electrode disposed along a path along which the developer accommodated in said developer accommodating portion moves to said developing member;

10          a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

15          a second electric contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

20          a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an electric signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main

assembly of the electrophotographic image forming apparatus.

14. A device according to Claim 12 or 13, wherein  
5 said developer path electrode is in the form of a  
plate extending along the path.

15. A device according to Claim 13, further  
comprising a third electrode provided between said  
10 second electrode said second electrode and said  
developing member.

16. A device according to Claim 15, wherein said  
third electrode is a member which is integral with or  
15 separate from said second electrode, and is disposed  
opposed to said developing member.

17. A device according to any one of Claims 13-  
16, wherein said first electrode and said second  
20 electrode are arranged along a length of said  
developing member which is in the form of a developing  
roller.

18. A device according to any one of Claims 13-  
25 17, wherein said first electrode and a frame  
supporting said second electrode constitute a recess  
extending parallel to said developing member, and said

recess opens downward.

19. A device according to any one of Claims 13-  
18, further comprising an intermediary electrode  
5 between said developing member and said developer path  
electrode.

20. A device according to any one of Claims 14-  
19, further comprising developer stirring means for  
10 stirring the developer, wherein at least said first  
electrode and second electrode are disposed in a  
moving range of the developer provided by rotation of  
said developer stirring means.

15 21. A device according to any one of Claims 1, 6  
or 13, further comprising a stirring member for  
stirring the developer accommodated therein, wherein  
at least a lower end of said second electrode takes a  
position lower than said first electrode in a  
20 direction of movement of the developer provided by  
said stirring member, when said developing device is  
mounted to the main assembly of the  
electrophotographic image forming apparatus.

25 22. A process cartridge detachably mountable to a  
main assembly of an electrophotographic image forming  
apparatus, comprising:

(a) an electrophotographic photosensitive member;

(b) a developing device including;

a developing member for supplying a developer

5 to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed opposed to said developing member; and

10 a second electrode disposed such that at least a lower end thereof takes a position lower than said first electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus, wherein

15 an electric signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image

20 forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

25 23. A process cartridge according to Claim 22, wherein said first electrode and said second electrode are disposed along a length of said developing member

which is in the form of a developing roller.

24. A process cartridge according to Claim 22 or  
23, wherein said first electrode and a frame  
5 supporting said second electrode constitute a recess  
extending parallel to said developing device frame,  
said recess opens downward.

25. A process cartridge according to Claim 22, 23  
10 or 24, wherein each of said first electrode and second  
electrode has a plate shape, wherein a length of said  
first electrode, measured in a direction crossing with  
a longitudinal direction of said developing member, is  
longer than said second electrode.

15

26. A process cartridge according to Claim 22 or  
23, wherein one and the other of said first and second  
electrodes are plate-like and rod-like electrodes.

20 27. A process cartridge detachably mountable to a  
main assembly of an electrophotographic image forming  
apparatus, comprising:

(a) an electrophotographic photosensitive  
member;

25 (b) a developing device including;  
a developing member for supplying a developer  
to said electrophotographic photosensitive member to

develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed opposed to said developing member;

5 a second electrode disposed such that at least a lower end thereof takes a position lower than said first electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus;

10 a third electrode disposed between said second electrode and said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to 15 said first electrode when said process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic 20 image forming apparatus, a voltage to be applied to send developing member when said process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus;

a third electrical contact for transmitting, 25 to the main assembly of said electrophotographic image forming apparatus, an electric signal corresponding at least to electrostatic capacities between said first

electrode and second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member, to detect a remaining amount 5 of the developer by the main assembly of the electrophotographic image forming apparatus.

28. A process cartridge according to Claim 27, wherein said first electrode and said second electrode 10 are disposed along a length of said developing member which is in the form of a developing roller.

29. A process cartridge according to Claim 27 or 28, wherein said first electrode and a frame 15 supporting said second electrode constitute a recess extending parallel to said developing device frame, said recess opens downward.

30. A process cartridge according to Claim 27, 28 20 or 29, wherein said third electrode is a member which is integral with or separate from said second electrode, and is disposed opposed to said developing member.

25 31. A process cartridge according to any one of Claims 27-30, further comprising a developer chamber having an opening in which said developing member is

supported, and a developer container, connected with said developer chamber, for accommodating the developer, wherein said first, second and third electrodes are provided in said developer chamber.

5

32. A process cartridge according to any one of Claims 22-31, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

10 33. A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

15 (a) an electrophotographic photosensitive member; and  
(b) a developing device including:  
a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

20 a developer accommodating portion for accommodating the developer to be used for development of the electrostatic latent image by said developing member; and

25 a developer path electrode disposed along a

RECORDED IN FEDERAL REGISTER

path along which the developer accommodated in said developer accommodating portion moves to said developing member;

wherein an electric signal corresponding to

- 5 an electrostatic capacity between said developing member and said developer path electrode is generated when a voltage is applied to said developing member from the main assembly of said electrophotographic image forming apparatus, to permit detection of a  
10 remaining amount of the developer by measuring the electric signal.

34. A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

(a) an electrophotographic photosensitive member; and

(b) a developing device including:

a developing member for supplying a developer  
20 to said electrophotographic photosensitive member to  
develop the electrostatic latent image formed on said  
electrophotographic photosensitive member;

a first electrode provided so as to exhibit the same or potential as said developing member;

25 a second electrode disposed such that at  
least a lower end thereof takes a position lower than  
said first electrode when said developing device is

mounted to the main assembly of the  
electrophotographic image forming apparatus;  
a developer path electrode disposed along a  
path along which the developer accommodated in said  
5 developer accommodating portion moves to said  
developing member;  
a first electrical contact for receiving,  
from the main assembly of said electrophotographic  
image forming apparatus, a voltage to be applied to  
10 said first electrode when said process cartridge is  
mounted to the main assembly of said  
electrophotographic image forming apparatus;  
a second electric contact for receiving, from  
the main assembly of said electrophotographic image  
15 forming apparatus, a voltage to be applied to said  
developing member when said process cartridge is  
mounted to the main assembly of said  
electrophotographic image forming apparatus; and  
a third electrical contact for transmitting,  
20 to the main assembly of the electrophotographic image  
forming apparatus, an electric signal corresponding to  
electrostatic capacities at least between said first  
electrode and said second electrode and between said  
developing member and said developer path electrode to  
25 detect a remaining amount of the developer by the main  
assembly of the electrophotographic image forming  
apparatus.

35. A process cartridge according to Claim 33 or 34, wherein said developer path electrode is in the form of a plate extending along the path.

5       36. A process cartridge according to Claim 34, further comprising a third electrode provided between said second electrode said second electrode and said developing member.

10       37. A process cartridge according to Claim 36, wherein wherein said third electrode is a member which is integral with or separate from said second electrode, and is disposed opposed to said developing member.

15       38. A process cartridge according to any one of Claims 33-37, wherein said first electrode and said second electrode are arranged along a length of said developing member which is in the form of a developing roller.

20       39. A process cartridge according to any one of Claims 33-38, wherein said first electrode and a frame supporting said second electrode constitute a recess 25 extending parallel to said developing member, and said recess opens downward.

40. A process cartridge according to any one of Claims 33-39, further comprising and intermediary electrode between said developing member and said developer path electrode.

5

41. A process cartridge according to any one of Claims 34-40, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a 10 moving range of the developer provided by rotation of said developer stirring means.

42. A process cartridge according to any one of Claims 22, 27 or 34, further comprising further 15 comprising a stirring member for stirring the developer accommodated therein, wherein at least a lower end of said second electrode takes a position lower than said first electrode in a direction of movement of the developer provided by said stirring member, when said developing device is mounted to the 20 main assembly of the electrophotographic image forming apparatus.

43. An electrophotographic image forming 25 apparatus for forming an image on a recording material, comprising:

(a) an electrophotographic photosensitive

member; and

(b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;

5 a developing device for developing an electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including:

a developing member for supplying the  
10 developer to said electrophotographic photosensitive member;

a first electrode disposed opposed to said developing member; a second electrode disposed such that at least a lower end thereof takes a position  
15 lower than said first electrode when said developing device is mounted to a main assembly of the electrophotographic image forming apparatus;

wherein an electric signal is generated in accordance with an electrostatic capacity between said  
20 first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is measured by the main assembly of the  
25 electrophotographic image forming apparatus to detect a remaining amount of the developer.

44. An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to said electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

- (a) an electrophotographic photosensitive member; and
  - mounting means for mounting the process cartridge, said process cartridge including:
    - a developing member for supplying a developer to said electrophotographic photosensitive member to develop an electrostatic latent image formed on said electrophotographic photosensitive member;
    - a first electrode disposed opposed to said developing member; and
      - a second electrode disposed such that at least a lower end thereof takes a position lower than said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus; and
    - said apparatus further comprising:
  - (b) electrostatic latent image forming means for forming the electrostatic latent image on said electrophotographic photosensitive member; and
    - developer remaining amount detecting means for detecting a remaining amount of the developer by

measuring an electric signal which is produced by application of a voltage to said first electrode or second electrode and which corresponds to an electrostatic capacity between said first electrode  
5 and second electrode.

45. An apparatus according to Claim 43 or 44, wherein said first electrode and said second electrode are disposed along a length of said developing member  
10 which is in the form of a developing roller.

46. A apparatus according to Claim 43, 44 or 45, wherein said first electrode and a frame supporting said second electrode constitute a recess extending  
15 parallel to said developing device frame, said recess opens downward.

47. An apparatus according to any one of Claims 43-46, wherein each of said first electrode and second  
20 electrode has a plate shape, wherein a length of said first electrode, measured in a direction crossing with a longitudinal direction of said developing member, is longer than said second electrode.

25 48. An apparatus according to Claim 43, 44 or 45, wherein one and the other of said first and second electrodes are plate-like and rod-like electrodes.

49. An electrophotographic image forming apparatus for forming an image on a recording material, comprising

- (a) an electrophotographic photosensitive member,
- (b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;
- (c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including;
  - a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;
  - a first electrode disposed opposed to said developing member;
  - a second electrode disposed such that at least a lower end thereof takes a position lower than said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;
  - a third electrode disposed between said second electrode and said developing member;
  - a first electrical contact for receiving, from the main assembly of said electrophotographic

image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

5           a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to send developing member when said developing device is mounted to the main assembly of said

10          electrophotographic image forming apparatus;

              a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an electric signal corresponding at least to electrostatic capacities between said first 15        electrode and second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member; and

(d) developer amount detecting means for  
20          detecting an amount of the developer in said developing device on the basis of the electric signal transmitted from said third electric contact.

50. An electrophotographic image forming  
25          apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said

electrophotographic image forming apparatus, said  
electrophotographic image forming apparatus  
comprising:

- (a) an electrophotographic photosensitive  
5 member;
- (b) mounting means for detachably mounting the  
process cartridge, the process cartridge including;
  - a developing member for supplying a developer  
to said electrophotographic photosensitive member to  
10 develop the electrostatic latent image formed on said  
electrophotographic photosensitive member;
  - a first electrode disposed opposed to said  
developing member;
  - a second electrode disposed such that at  
15 least a lower end thereof takes a position lower than  
said first electrode when said developing device is  
mounted to the main assembly of the  
electrophotographic image forming apparatus;
  - a third electrode disposed between said  
20 second electrode and said developing member;
  - a first electrical contact for receiving,  
from the main assembly of said electrophotographic  
image forming apparatus, a voltage to be applied to  
said first electrode when said developing device is  
25 mounted to the main assembly of said  
electrophotographic image forming apparatus;
  - a second electrical contact for receiving,

from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to send developing member when said developing device is mounted to the main assembly of said

5       electrophotographic image forming apparatus; and

            a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an electric signal corresponding at least to electrostatic capacities between said first 10      electrode and second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member, to detect a remaining amount of the developer by the main assembly of the 15      electrophotographic image forming apparatus;

            (c) electrostatic latent image forming means for forming the electrostatic latent image on said electrophotographic photosensitive member; and

            (d) developer amount detecting means for 20      detecting an amount of the developer in said developing device on the basis of the electric signal transmitted from said third electric contact.

51. An apparatus according to Claim 49 or 50,  
25      wherein said first electrode and said second electrode are disposed along a length of said developing member which is in the form of a developing roller.

52. An apparatus according to Claim 49, 50 or 51,  
wherein said first electrode and a frame supporting  
said second electrode constitute a recess extending  
parallel to said developing member, and said recess  
5 opens downward.

53. An apparatus according to Claim 49, 50, 51 or  
52, wherein said third electrode is a member which is  
integral with or separate from said second electrode,  
10 and is disposed opposed to said developing member.

54. An apparatus according to any one of Claims  
49-53, further comprising a developer chamber having  
an opening in which said developing member is  
15 supported, and a developer container, connected with  
said developer chamber, for accommodating the  
developer, wherein said first, second and third  
electrodes are provided in said developer chamber.

20 55. An apparatus according to any one of Claims  
43-54, further comprising developer stirring means for  
stirring the developer, wherein at least said first  
and second electrodes are disposed in a moving range  
of the developer provided by rotation of said  
25 developer stirring means.

56. An electrophotographic image forming

apparatus for forming an image on a recording material, comprising

(a) an electrophotographic photosensitive member,

5 (b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;

10 (c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including;

15 a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a developer accommodating portion for accommodating the developer to be used for development of the electrostatic latent image by said developing member; and

20 a developer path electrode disposed along a path along which the developer accommodated in said developer accommodating portion moves to said developing member;

25 wherein an electric signal corresponding to an electrostatic capacity between said developing member and said developer path electrode is generated when a voltage is applied to said developing member

from the main assembly of said electrophotographic image forming apparatus, to permit detection of a remaining amount of the developer by measuring the electric signal.

5

57. An electrophotographic image forming apparatus for forming an image on a recording material, comprising

10 (a) an electrophotographic photosensitive member,

(b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;

15 (c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including;

20 a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode provided so as to exhibit the same potential as said developing member;

25 a second electrode disposed such that at least a lower end thereof takes a position lower than said first electrode when said developing device is mounted to the main assembly of the

DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE

electrophotographic image forming apparatus;

a developer path electrode disposed along a path along which the developer accommodated in said developer accommodating portion moves to said  
5 developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is  
10 mounted to the main assembly of said electrophotographic image forming apparatus;

a second electric contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said  
15 developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an electric signal corresponding to  
20 electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main  
25 assembly of the electrophotographic image forming apparatus.

- DEPARTMENT OF COMMERCE
58. An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said
- 5 electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:
- (a) an electrophotographic photosensitive member;
- 10 (b) mounting means for detachably mounting the process cartridge, the process cartridge including; a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said
- 15 electrophotographic photosensitive member; a developer accommodating portion for accommodating the developer to be used for development of the electrostatic latent image by said developing member; and
- 20 a developer path electrode disposed along a path along which the developer accommodated in said developer accommodating portion moves to said developing member;
- wherein an electric signal corresponding to
- 25 an electrostatic capacity between said developing member and said developer path electrode is generated when a voltage is applied to said developing member

from the main assembly of said electrophotographic image forming apparatus, to permit detection of a remaining amount of the developer by measuring the electric signal.

5

59. An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said
- 10 electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:
- (a) an electrophotographic photosensitive member;
- 15 (b) mounting means for detachably mounting the process cartridge, the process cartridge including; a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said
- 20 electrophotographic photosensitive member;
- a first electrode provided so as to exhibit the same or potential as said developing member;
- a second electrode disposed such that at least a lower end thereof takes a position lower than
- 25 said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;

a developer path electrode disposed along a path along which the developer accommodated in said developer accommodating portion moves to said developing member;

5           a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said

10       electrophotographic image forming apparatus;

            a second electric contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of said

15       electrophotographic image forming apparatus; and

            a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an electric signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming

20       apparatus;

            (b) electrostatic latent image forming means for forming the electrostatic latent image on said

electrophotographic photosensitive member; and

(c) developer amount detecting means for  
detecting an amount of the developer in said  
developing device on the basis of the electric signal  
transmitted from said third electric contact.

60. An apparatus according to any one of Claims  
56-59, wherein said developer path electrode is in the  
form of a plate extending along the path.

10

61. An apparatus according to any one of Claims  
56-60, further comprising a third electrode provided  
between said second electrode said second electrode  
and said developing member.

15

62. An apparatus according to according to Claim  
61, wherein said third electrode is a member which is  
integral with or separate from said second electrode,  
and is disposed opposed to said developing member.

20

63. An apparatus according to any one of Claims  
56-62, wherein said first electrode and said second  
electrode are arranged along a length of said  
developing member which is in the form of a developing  
25 roller.

64. An apparatus according to any one of Claims

56-63, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing member, and said recess opens downward.

5

65. An apparatus according to any one of Claims 56-64, further comprising an intermediary electrode between said developing member and said developer path electrode.

10

66. An apparatus according to any one of Claims 56-65, further comprising developer stirring means for stirring the developer, wherein at least said first electrode and second electrode are disposed in a moving range of the developer provided by rotation of said developer stirring means.

67. A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with an electrophotographic image forming apparatus, said developing device comprising:

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed opposed to said developing member;

a stirring member for stirring the developer accommodated;

5 a second electrode which is disposed at a position different from that of said first electrode in a direction crossing with a moving direction of the developer provided by said stirring member;

10 wherein an electric signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is 15 measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

68. A device according to Claim 67, wherein said 20 first electrode and said second electrode are disposed along a length of said developing member which is in the form of a developing roller.

69. A device according to Claim 67 or 68, wherein 25 said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing device frame, said recess

opens downward.

70. A device according to Claim 67, 68 or 69,  
wherein each of said first electrode and second  
5 electrode has a plate shape, wherein a length of said  
first electrode, measured in a direction crossing with  
a longitudinal direction of said developing member, is  
longer than said second electrode.

10 71. A device according to Claim 67 or 68, wherein  
one and the other of said first and second electrodes  
are plate-like and rod-like electrodes.

15 72. A process cartridge detachably mountable to a  
main assembly of an electrophotographic image forming  
apparatus, comprising:

(a) an electrophotographic photosensitive  
member; and

(b) a developing device including:

20 a developing member for supplying a developer  
to said electrophotographic photosensitive member to  
develop the electrostatic latent image formed on said  
electrophotographic photosensitive member;

a first electrode disposed opposed to said  
25 developing member;

a stirring member for stirring the developer  
accommodated;

a second electrode which is disposed at a position different from that of said first electrode in a direction crossing with a moving direction of the developer provided by said stirring member;

5           wherein an electric signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said  
10          electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

15          73. A process cartridge according to Claim 72, wherein said first electrode and said second electrode are disposed along a length of said developing member which is in the form of a developing roller.

20          74. A process cartridge according to Claim 72 or 73, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing device frame, said recess opens downward.

25

75. A process cartridge according to Claim 72, 73 or 74, wherein each of said first electrode and second

electrode has a plate shape, wherein a length of said first electrode, measured in a direction crossing with a longitudinal direction of said developing member, is longer than said second electrode.

5

76. A process cartridge according to Claim 72 or 73, wherein one and the other of said first and second electrodes are plate-like and rod-like electrodes.

10

77. An electrophotographic image forming apparatus for forming an image on a recording material, comprising

(a) an electrophotographic photosensitive member,

15

(b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;

20

(c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

25

a first electrode disposed opposed to said developing member;

a stirring member for stirring the developer accommodated;

5 a second electrode which is disposed at a position different from that of said first electrode in a direction crossing with a moving direction of the developer provided by said stirring member;

10 wherein an electric signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect 15 a remaining amount of the developer.

78. An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said 20 electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

25 (a) an electrophotographic photosensitive member;

(b) mounting means for detachably mounting the process cartridge, the process cartridge including;

a developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

5 a first electrode disposed opposed to said developing member;

a stirring member for stirring the developer accommodated;

10 a second electrode which is disposed at a position different from that of said first electrode in a direction crossing with a moving direction of the developer provided by said stirring member;

(c) electrostatic latent image forming means for forming the electrostatic latent image on said 15 electrophotographic photosensitive member; and

(d) developer amount detecting means for detecting an amount of the developer in said developing device on the basis of the electric signal transmitted from said third electric contact.

20

79. An apparatus according to Claim 77 or 78, wherein said first electrode and said second electrode are disposed along a length of said developing member which is in the form of a developing roller.

25

80. An apparatus according to Claim 77, 78 or 79, wherein said first electrode and a frame supporting

said second electrode constitute a recess extending parallel to said developing device frame, said recess opens downward.

5        81. An apparatus according to Claim 77-80,  
wherein each of said first electrode and second  
electrode has a plate shape, wherein a length of said  
first electrode, measured in a direction crossing with  
a longitudinal direction of said developing member, is  
10 longer than said second electrode.

82. An apparatus according to Claim 77, 78 or 79,  
wherein one and the other of said first and second  
electrodes are plate-like and rod-like electrodes.

15

20

25